B O C A G I A N A

Museu Municipal do Funchal

Madeira 17. XII. 1959 No. 4

ON A SPECIMEN OF *BATHYLACO NIGRICANS* GOOD AND BEAN TAKEN FROM THE STOMACH OF *APHANOPUS CARBO*

By G. E. Maul

In 1948 Parr reported on a specimen of the genus *Bathylaco* which was taken by the «Dana» in the Pacific off Columbia, 6°48'N 8°33'W with 3500 meters of wire out. In his paper this author deals with the classification of the fishes belonging to the genera *Bathylaco* and *Macromastax* and gives a description and a large number of measurements and counts of both the «Dana» specimen and Good & Bean's type. Inspite of a number of differences he finds in the proportions and numerical values between the two he prefers to consider them conspecific, possibly together with the type of *Macromastax gymnus* Beebe, suggesting that its relatively large eyes and nakedness of body may only be juvenile features. The only specimens recorded up to 1948 that might belong to the species *Bathylaco nigricans* were the 3 mentioned above, and, to the author's knowledge, still are to the date of writing this note. The appearance of a further specimen is, therefore, of considerable interest.

DESCRIPTION

The present specimen was taken from the stomach of an *Aphanopus carbo* on 3.X.1959. Reg. No. 16400. Almost all the skin on the body has been digested away but is more or less preserved on the head, on part of the lateral line of the left side, and on the anterior half of the right

side of the abdomen, where, near the head, a few scales are still preserved. The subopercles and the supramaxillaries are lost on both sides. On the left side also the opercle and part of the left ventral fin is missing. On the right side the two upper branchiostegal rays and the premaxillary are missing. There is a large hole on the underside of the abdomen but the organs of the cavity are well preserved. The specimen is therefore totally deprived only of the subopercles and supramaxillaries. All the existing parts are well preserved and allow for reliable counts and measurements, except perhaps that of the distance between snout and ventral fins, as owing to the hole in the abdominal cavity the latter may be slightly displaced, that is, their proper situation may be slightly more forward in the undamaged specimen. There is also a possibility that one or at most two of the anterior rays of the dorsal and anal were lost, which would make the distances from snout to dorsal and snout to anal slightly less.

Proportions: The following figures give the measurements in mm.

Standard length measured to the most distant point of the hypural 223. Head 60. Eye 11. Snout 11. Interorbital 9.7. Greatest width of skull 23. Upper jaw (from snout-tip to distal end of maxillary) 41. Lower jaw (from tip of symphysis to angle of articular) 42. Greatest depth about 38. Snout-tip to dorsal 125 (it is possible that one or two small rays before the first existing one may have been lost. In which case this distance would be slightly shorter). Snout-tip to ventral 132 (should possibly be slightly less as the ventrals may have moved slightly backwards because of the large abdominal rupture). Snout-tip to anal 167 (here the same applies as to the measurement from snout-tip to dorsal). Base of dorsal 55.5 (possibly slightly more). Base of anal 22.5 (possibly slightly more). Length of ventrals abt. 18. Longest ray of caudal abt. 38. Longest gill-raker 5.2. Length of upper branchiostegal ray 12.5. Width of upper branchiostegal ray 3.3. Longest coecum 35. Posterior length of stomach from crotch of pyloric arm 30. Same from behind pyloric arm 24.

Counts: Fin-rays: Dorsal 21? Anal 12? Pectorals 8/8. Ventral (right) 8. Branchiostegal rays; left side 10 (complete, 6 on ceratohyal and 4 on epihyal), right side 7 (incomplete, 5 on ceratohyal and 2 anterior ones on epihyal). Judging from the length of the unoccupied posterior part of the epihyal, there can only have been 2 more rays. The series on the ceratohyal is certainly complete, so that the total for the right side

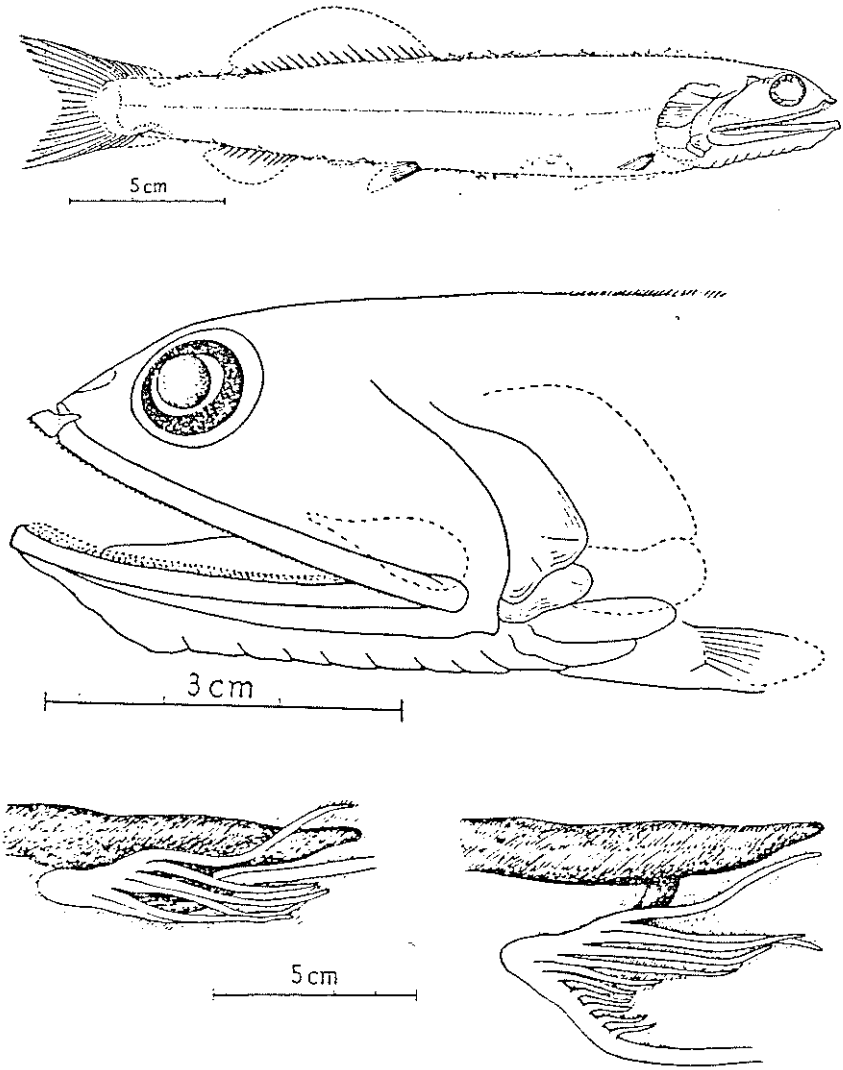

FIG. 1. — *Bathylaco nigricans,* Reg. No. 16400. Two lower figures stomach with pyloric coeca; on the left in normal position, on the right bent so as to show the 5 smaller appendages hidden below the longer ones, in normal position.

must have been 9). Gill-rakers 11 (3-1-7). Pyloric coeca 11 (7 outer large ones and 4 inner smaller ones, concealed by the former).

Teeth: On the maxillary there are about 115 small pointed teeth, consisting of two sizes, the larger ones alternating with the smaller ones in such a way that the larger ones are slightly more to the inside, thus forming two rows not entirely separated from each other. The separation between these two rows becomes gradually more pronounced towards the snout, and at the junction with the teeth of the premaxillary they run evenly into two distinct and quite separated rows of that bone. The dentition of the latter is composed of 6 larger inner ones, contiguous with the inner row of the maxillary, 11 smaller ones contiguous with the outer row of the maxillary, and near the snout-tip there is a further outer row consisting of 3 minute teeth. This appears to be the first specimen with a premaxillary intact and complete with teeth. The vomer is toothless. The palatines have a distinct oval anterior patch of teeth, consisting of 3 to 6 rows. Behind this there is a row about twice as long as the anterior patch, consisting anteriorly of two rows, and posteriorly of a single one. The lower jaw bears 2 to 4 rows of teeth similar to those of the upper jaw, the largest inside. No teeth on tongue. There are also patches of very minute teeth on the upper and lower pharyngeal bones.

There are no groups of minute club-shaped organs visible on the skin of the head, as described by Parr for the «Dana» specimen, but this is undoubtedly due to the state of deterioration of the skin. On the left side just before the eye, a large comma-shaped concave black depression suggests that a preorbital luminous organ of that shape, as described by Parr, may have been present.

The opercle is conspicuously striated and its border is deeply notched between the ends of the striae.

The few scales still present are cycloid, with numerous fine striae, of the type as figured by Parr (Fig. 2G). Those parts of the skin that are still preserved suggest that the whole fish must have been brownish purplish black.

COMPARISON WITH THE SPECIMENS OF THE GENUS *BATHYLACO* AND *MACROMASTAX* PREVIOUSLY DESCRIBED

It is interesting to note that the present specimen agrees closely with the type in most of those characters that differ noticeably from Parr's specimen as the comparison of table 1 on page 6 clearly shows. In this table the few proportions and counts we know from Beebe's description of *Macromastax gymnus* have been included.

It must be pointed out that the difference in the length of the posterior part of the stomach may be due to contraction or extension of that part. On the other hand this is less likely to apply to the difference in size of the pyloric coeca as well. It is probably of some significance that these are very distinctly larger in the Madeira specimen than in the «Dana» specimen. Other differences that bear some weight are those of the length of the gill-rakers and of the upper branchiostegal ray. In the counts the dorsal and anal had better not be considered as the counts of 21 and 12 respectively, though very likely to be correct, may be slightly more. All the other counts are quite reliable, in which case there is disagreement between the «Dana» and the Madeiran specimen in the ventral rays, the branchiostegal rays, the gill-rakers, and the pyloric coeca. It is, therefore, possible to speak of 7 characters which either proportionally or numerically disagree with the «Dana» specimen and, while it is true that in all cases these differences could fall into a natural ambit of variation in one and the same species, it is interesting to note, and possibly of some significance, that out of these 7 characters 3 are in good agreement with the type of *Bathylaco nigricans*. Unfortunately details of the other 4 characters are not known for the type. This difference from Parr's specimen on one hand and similarity to the type on the other takes on a particular significance if we consider that the «Dana» specimen comes from the Pacific Ocean whereas the type of *B. nigricans* was taken in the Atlantic Ocean. Although the scantiness of the material does not so far allow for differenciation, the new specimen would suggest that there may be two distinct forms living in two different oceans, a possibility already hinted at by Parr in pointing out the greater number of fin rays and the greater length of the bases of the dorsal and anal fins in the «Dana» specimen.

In the type of *Macromastax gymnus* not much importance can be

TAB. 1. — Comparison of proportions and counts of the present specimen of *Bathylaco nigricans*, the «Dana» specimen, the type, and *Macromastax gymnus* Beebe (type)

	Madeiran specimen	«Dana» specimen	Type	Macromastax gymnus
S.L. (mm)	223	215	209	55
PERCENT OF STANDARD LENGTH				
Head	27	27	25.6	36.7
Eye	4.9	5.0	5.0	10.0
Snout	4.9	4.4	3.6	6.0
Interorbital	4.4	4.7	4.4	—
Greatest width of skull	10.3	11.2	10.2	—
Upper jaw	18.3	18.1	17.5	24.3*
Lower jaw	18.8	18.8	18.5	—
Greatest depth	17	18.1	abt. 14	18.6
Snout to dorsal	abt. 56	57.8	55.2	—
Snout to ventral	abt. 59	55.5	54.4	—
Snout to anal	abt. 75.5	70.2	71.3	—
Base of dorsal	abt. 24.8	22.5	27.5	—
Base of anal	abt. 10.1	10.7	11.7	—
Length of ventral	abt. 8.1	8.8	—	18.0
Longest ray of caudal	abt. 17	18.1	—	—
Longest gill-raker	2.3	3.4	—	—
Length of upper branchiostegal	5.6	7.0	—	—
Width of same	1.5	1.85	—	—
Longest coecum	17.7	15.5	—	—
Posterior length of stomach from crotch of pyloric arm	13.4	16.3	—	—
Same length from behind pyloric arm	10.7	13.7	—	—
COUNTS				
Dorsal	21?	19	23	25
Anal	12	12	13	12
Pectorals	8.8	7.6	6?	ca.10
Ventrals	(8 right)	6.7	8	7
Branchiostegal rays	10/9	8	9	9
Gill-rakers	3-1-7 (total 11	4-1-8 (total 13)	4-0-7 (total 11)	—
Pyloric coeca	11	7	—	—

* «maxillary»

attached to proportional differences when these proportions are compared to the standard length, considering that it only measures 35mm. in S.L. as compared to 209-223mm. However, if the position of details are considered in relation to one another, it is found that there is a greater similarity of this specimen to the Madeiran and the type of *B. nigricans* than to the «Dana» specimen in that in all 3 the ventrals are inserted distinctly behind the origin of the dorsal, whereas in the «Dana» specimen they are a considerable distance in advance of this point. The possibility that this is merely due to the larger number of dorsal rays in the type of *B. nigricans* (hence longer base, hence more advanced origin) is ruled out by the fact that in the present specimen the dorsal begins well before the insertion of the ventrals with only 21 rays. The possible slight displacement of the ventrals mentioned earlier on can at most amount to 1 or 2mm., and would therefore at a maximum advance towards the snout still be well behind the dorsal origin. In the counts definite figures for both the present specimen and *M. gymnus* are only known for anal rays, ventral rays and branchiostegal rays. In the first character the count is 12-13 in the 4 specimens. In the second character, the number of ventral rays, Parr has even found a variation between the left and the right fin of his specimen. The «Dana» specimen has thus a count of 6/7 for this character, the Madeiran and the type of *B. nigricans* 8, and *M. gymnus* 7. The value of the ventral fin ray count of the last lies about in the centre of the ambit resulting from the counts of the 3 other specimens. The number of the branschiostegal rays may of course vary too, but, nevertheless, the «Dana» specimen stands alone with the low count of 8, whereas the remaining 3 have 9 rays and the Madeiran one even an additional one on the left side.

To summarize these results, all three Atlantic specimens have two characters in common that differ at the same time from the «Dana» specimen, namely the higher count of the branchiostegal rays and the ventrals being situated distinctly behind the dorsal origin. In the type of *B. nigricans* and the Madeiran specimen we know of an additional character common to these two, namely the lower number of gill-rakers. Fishes of the genus *Bathylaco* seem extremely rare, it will, therefore, probably be some time before enough material comes to hand to decide whether the 4 specimens discussed here belong to the same species or whether there is at least an Atlantic and a Pacific form.

LITERATURE CONSULTED

Beebe, W.:

1933a. Deep-sea isospondylous fishes. *Zoologica*, vol. 13, No. 8, pp. 159-167.

1933b. Deep-sea fishes of the Bermuda Oceanographic Expeditions. *Ibid.*, vol. 16, Nos. 1-3, pp. 5-147.

Goode, G. B., and T. H. Bean:

1895. Oceanic Ichthyology.

Parr, A. E.:

1948. The Classification of the Fishes of the Genera *Bathylaco* and *Macromastax*, Possible Intermediate between the Isospondyli and Iniomi. *Copeia*, No. 1, April 15.